



GAS WATER HEATERS

OWNER'S MANUAL

Thank you for buying this energy efficient water heater from A.O. Smith Water Products Company. We appreciate your confidence in our products.

You should thoroughly read this manual before installation and/or operation of this water heater. Please pay particular attention to the important safety and operating instructions as well as the WARNINGS and CAUTIONS.

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

FPD SEALED SHOT™ WITH HOT SURFACE IGNITION AND SMART VALVE™



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CAUTION: TEXT PRINTED OR OUTLINED IN RED CONTAINS INFORMATION RELATIVE TO YOUR SAFETY. PLEASE READ THOROUGHLY BEFORE INSTALLING AND USING THIS APPLIANCE.

A.O. SMITH
WATER PRODUCTS
COMPANY

A DIVISION OF A.O. SMITH CORPORATION
www.hotwater.com

KEEP THIS MANUAL IN THE POCKET ON HEATER FOR FUTURE REFERENCE
WHENEVER MAINTENANCE ADJUSTMENT OR SERVICE IS REQUIRED.

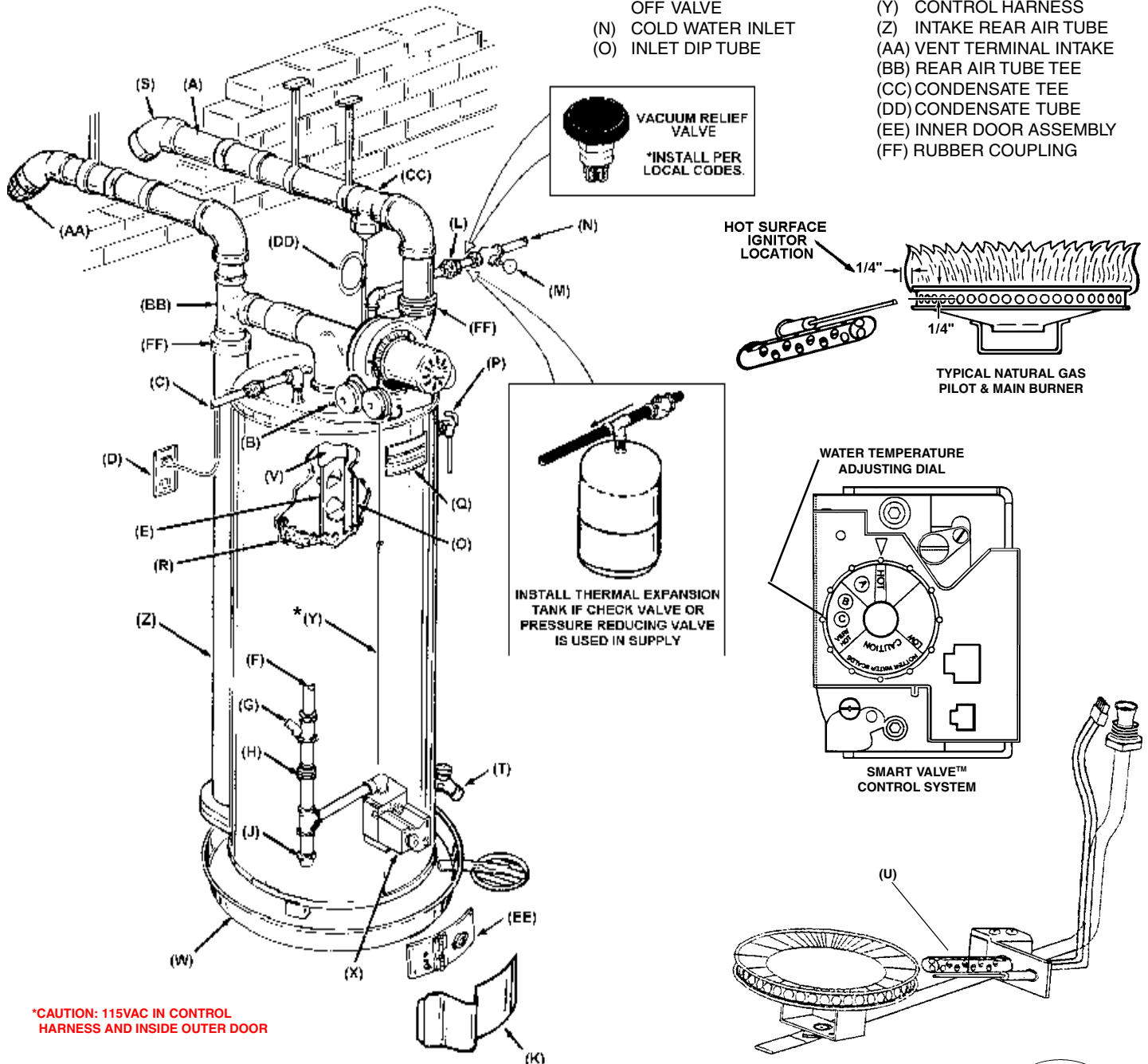


GET TO KNOW YOUR WATER HEATER

REPLACEMENT PARTS AND DELIMING PRODUCTS

Replacement parts and recommended delimer may be ordered through authorized servicers or distributors. Refer to the Yellow Pages for where to call or contact the A.O. Smith Water Products Company, 5621 W. 115th Street, Alsip, IL 60803, 1-800-433-2545. When ordering parts, provide complete model and serial numbers (see rating plate), quantity and name or part desired (as listed in fig. 1). Standard hardware items may be purchased locally.

- | | |
|------------------------------------|---|
| (A) VENT PIPE-EXHAUST | (P) TEMPERATURE AND PRESSURE RELIEF VALVE |
| (B) ANODE | (Q) EMBLEM AND RATING PLATE |
| (C) HOT WATER OUTLET | (R) INSULATION |
| (D) OUTLET (115 V. AC) | (S) VENT TERMINAL EXHAUST |
| (E) FLUE BAFFLE | (T) DRAIN VALVE |
| (F) GAS SUPPLY | (U) HSI ASSEMBLY |
| (G) MAIN MANUAL GAS SHUT OFF VALVE | (V) FLUE |
| (H) GROUND JOINT UNION | (W) DRAIN PAN |
| (J) DIRT LEG | (X) GAS VALVE |
| (K) OUTER DOOR | (Y) CONTROL HARNESS |
| (L) UNION | (Z) INTAKE REAR AIR TUBE |
| (M) INLET WATER SHUT OFF VALVE | (AA) VENT TERMINAL INTAKE |
| (N) COLD WATER INLET | (BB) REAR AIR TUBE TEE |
| (O) INLET DIP TUBE | (CC) CONDENSATE TEE |
| | (DD) CONDENSATE TUBE |
| | (EE) INNER DOOR ASSEMBLY |
| | (FF) RUBBER COUPLING |



*CAUTION: 115VAC IN CONTROL HARNESS AND INSIDE OUTER DOOR

GAS MODELS
FPD SEALED SHOT™
 WITH HOT SURFACE IGNITION & SMART VALVE™

FIGURE 1

A.O. SMITH
WATER PRODUCTS
COMPANY





GENERAL SAFETY INFORMATION

EXTERNAL DAMAGE

Do not operate the water heater until it has been fully checked out by a qualified technician, if the water heater:

- Has been exposed to fire or damage.
- Displays evidence of sooting.
- Produces steam or unusually hot water.

If the water heater has been flooded it must be replaced.

CHEMICAL VAPOR CORROSION



WARNING

CORROSION OF THE FLUEWAYS AND VENT SYSTEM MAY OCCUR IF AIR FOR COMBUSTION CONTAINS CERTAIN CHEMICAL VAPORS WHICH WILL BREAK DOWN INTO ACIDS AT HIGH TEMPERATURE. SUCH CORROSION MAY RESULT IN FAILURE AND RISK OF ASPHYXIATION.

Spray can propellants, cleaning solvents, refrigerator and air conditioning refrigerants, swimming pool chemicals, calcium and sodium chloride, waxes, and process chemicals are typical compounds which are potentially corrosive.

Do not store products of this sort near the heater. Also, air which is brought in contact with the heater should not contain any of these chemicals. If necessary, uncontaminated air should be obtained from remote or outside sources. The limited warranty is voided when failure of water heater is due to a corrosive atmosphere. (Refer to the limited warranty for complete terms and conditions).

EXTENDED NON-USE PERIODS



WARNING

HYDROGEN GAS CAN BE PRODUCED IN A HOT WATER SYSTEM SERVED BY THIS HEATER THAT HAS NOT BEEN USED FOR A LONG PERIOD OF TIME (GENERALLY TWO WEEKS OR MORE). HYDROGEN GAS IS EXTREMELY FLAMMABLE. To reduce the risk of injury under these conditions, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. **THERE SHOULD BE NO SMOKING OR OPEN FLAME NEAR THE FAUCET AT THE TIME IT IS OPEN.**

INSULATION BLANKETS

Insulation blankets available to the general public for external use on gas water heaters are not approved for use on your A. O. Smith water heater. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank water heaters. Your A. O. Smith water heater meets or exceeds the National Appliance Energy Conservation Act standards with respect to insulation and standby loss requirements, making an insulation blanket unnecessary.



WARNING

Should you choose to apply an insulation blanket to this heater, you should follow these instructions (See Figure 1 for identification of components mentioned below). Failure to follow these instructions can restrict the air flow required for proper combustion, potentially resulting in fire, asphyxiation, serious personal injury or death.

- Do not cover the outer door, thermostat or temperature & pressure relief valve.
- Do not cover the instruction manual. Keep it on the side of the water heater or nearby for future reference.
- Do obtain new warning and instruction labels from A.O. Smith for placement on the blanket directly over the existing labels.

LIQUID PETROLEUM MODELS



WARNING

Water heaters for propane or liquefied petroleum gas (LPG) are different from natural gas models. A natural gas heater will not function safely on LP gas and no attempt should be made to convert a heater from natural gas to LP gas.

LP gas must be used with great caution. It is highly explosive and heavier than air. It collects first in the low areas making its odor difficult to detect at nose level. If LP gas is present or even suspected, do not attempt to find the cause yourself. Go to a neighbor's house, leaving your doors open to ventilate the house, then call your gas supplier or service agent. Keep area clear until a service call has been made.

At times you may not be able to smell an LP gas leak. One cause is odor fade, which is a loss of the chemical odorant that gives LP gas its distinctive smell. Another cause can be your physical condition, such as having a cold or a diminishing sense of smell with age. For these reasons, the use of a propane gas detector is recommended.

IF YOU EXPERIENCE AN OUT-OF-GAS SITUATION, DO NOT TRY TO RELIGHT APPLIANCES YOURSELF. Ask your LP delivery person to relight pilots for you. Only trained LP professionals should conduct the required safety checks in accordance with industry standards.



INSTALLATION

REQUIRED ABILITY

INSTALLATION OR SERVICE OF THIS WATER HEATER REQUIRES ABILITY EQUIVALENT TO THAT OF A LICENSED TRADESMAN IN THE FIELD INVOLVED. PLUMBING, AIR SUPPLY, VENTING AND GAS SUPPLY ARE REQUIRED.

GENERAL

The installation must conform to these instructions and the local code authority having jurisdiction. In the absence of local codes, the installation must comply with the latest editions of the National Fuel Gas Code, ANSI Z223.1/NFPA 54 and the National Electrical Code, NFPA 70. The former is available from the Canadian Standards Association, 8501 East Pleasant Valley Road, Cleveland, OH 44131, and both documents are available from the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

The appliance, when installed, must be electrically grounded in accordance with local codes or in the absence of local codes with the latest edition of the National Electrical Code, ANSI/NFPA 70.

LOCATION OF HEATER

The heater is design certified by the American Gas Association for installation on combustible flooring in a closet having minimum clearances from combustible material of: 0" clearance from sides and rear, 4" from the front and 21" from the top. (Standard clearance.) If clearances stated on the heater differ from standard clearances, install water heater according to clearances stated on heater.

A minimum clearance of 4" must be allowed for access to replaceable parts such as the thermostats, drain valve and relief valve.

Adequate clearance for servicing this appliance should be considered before installation, such as changing the anodes, etc.

When installing the heater, consideration must be given to proper location. Location selected should be as close to the wall as practicable and as centralized with the water piping system as possible.

CAUTION


In cold climates provide protection against freeze-up. THE HEATER SHOULD BE LOCATED IN AN AREA WHERE LEAKAGE OF THE TANK OR CONNECTIONS WILL NOT RESULT IN DAMAGE TO THE AREA ADJACENT TO THE HEATER OR TO LOWER FLOORS OF THE STRUCTURE.


When such locations cannot be avoided, a suitable drain pan should be installed under the heater, see fig. 1. The pan should have a minimum length and width of at least 2 inches greater than the diameter of the heater and should be piped to an adequate drain. Drain pans suitable for these heaters are available from your dealer or A. O. Smith Water Products Company, 5621 W. 115th Street, Alsip, Illinois 60803.

WARNING

DO NOT INSTALL THIS WATER HEATER DIRECTLY ON A CARPETED FLOOR. A FIRE HAZARD MAY RESULT. Instead the water heater must be placed on a metal or wood panel extending beyond the full width and depth by at least 3 inches (76.2mm) in any direction. If the heater is installed in a carpeted alcove or closet, the entire floor shall be covered by the panel. Also, see DRAINING.

**FLAMMABLE**

**Flammable Vapors**

 **Vapors from flammable liquids may explode and catch fire causing death or severe burns.**

Water heater has a main burner and hot surface igniter. The hot surface igniter:

1. can come on at any time and
2. will ignite flammable vapors.

Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.

Vapors:

1. cannot be seen,
2. are heavier than air,
3. go a long way on the floor and
4. can be carried from other rooms to the pilot flame by air currents.

Keep flammable products:

1. far away from heater,
2. in approved containers,
3. tightly closed and
4. out of children's reach.

Installation:
Do not install water heater at least 18" above the floor. This where flammable products will be stored or used unless the risk of vapors being ignited by the main burner and pilot flames are the main burner or pilot flame.

WATER CONNECTIONS

Refer to figure 1 for typical installation. A suitable pipe thread sealant must be used to prevent leakage.

WATER (POTABLE) HEATING AND SPACE HEATING

1. All piping components connected to this unit for space heating applications shall be suitable for use with potable water.
2. Toxic chemicals, such as those used for boiler treatment, shall NEVER be introduced into this system.
3. This unit may NEVER be connected to any existing heating system or component(s) previously used with a non-potable water heating appliance.
4. When the system requires water for space heating at temperatures higher than required for domestic water purposes, a tempering valve must be installed. Please refer to Fig. 2 for suggested piping arrangement.

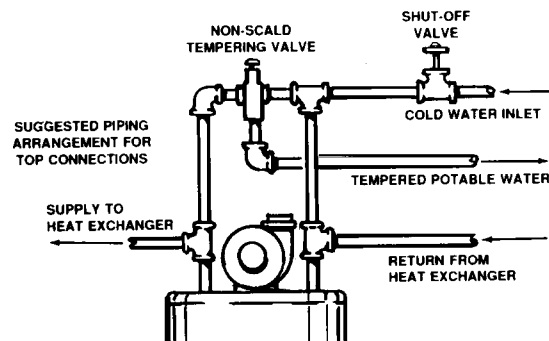


FIGURE 2

CLOSED WATER SYSTEM

A closed system will exist if a back-flow preventer (check valve), pressure reducing valve, or other similar device is installed in the cold water line between the water heater and the street main (or well). Excessive pressure may develop due to the thermal expansion of heated water causing premature tank failure or intermittent relief valve operation. This type of failure is not covered by the limited warranty. An expansion tank may be necessary in the cold water supply to alleviate this situation, see Fig. 1. Contact the local plumbing authority.

If the temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct the situation. **Do not plug the temperature and pressure relief valve.**

GAS CONNECTIONS

The minimum gas supply pressure is for input adjustment 4.5" W.C for natural gas (11.0" W.C. for propane).

THE HEATER IS NOT INTENDED FOR OPERATION AT HIGHER THAN 14.0 WATER COLUMN SUPPLY PRESSURE. EXPOSURE TO HIGHER GAS SUPPLY PRESSURE MAY CAUSE DAMAGE TO THE CONTROL WHICH COULD RESULT IN FIRE OR EXPLOSION. If overpressure has occurred such as through improper testing of gas lines or emergency malfunction of the supply system, the control must be checked for safe operation. Make sure that the outside vents on the supply regulators and the safety vent valves are protected against blockage. These are parts of the gas supply system not the heater. Vent blockage may occur during ice storms.

IT IS IMPORTANT TO GUARD AGAINST CONTROL FOULING FROM CONTAMINANTS IN THE GAS WAYS. SUCH FOULING MAY CAUSE IMPROPER OPERATION, FIRE OR EXPLOSION.

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1 NFPA-54) whichever applies. Copper and brass tubing and fittings (except tin lined copper tubing) shall not be used.

REFER TO FIG. 1 FOR CONNECTION DETAILS. BEFORE ATTACHING THE GAS LINE BE SURE THAT ALL GAS PIPE IS CLEAN ON THE INSIDE.

TO TRAP ANY DIRT OR FOREIGN MATERIAL IN THE GAS SUPPLY LINE, A DIRT LEG (SOMETIMES CALLED DRIP LEG) MUST BE INCORPORATED IN THE PIPING, FIG. 1. The dirt leg must be readily accessible. Install in accordance with recommendations of serving gas supplier. Refer to the latest edition of ANSI Z223.1.

To prevent damage, care must be taken not to apply too much torque when attaching gas supply pipe to gas valve inlet. The valve inlet has a hexagon shape for use with a backup wrench.

Apply joint compounds (pipe dope) sparingly and only to the male threads of pipe joints. Do not apply compound to the first two threads. Use compounds resistant to the action of liquefied petroleum gases. Do not use teflon tape on gas valve.

DISCONNECT THE APPLIANCE AND ITS INDIVIDUAL SHUT OFF VALVE FROM THE GAS SUPPLY PIPING SYSTEM

DURING ANY SUPPLY PRESSURE TESTING EXCEEDING 1/2 PSI (3.5 kPa). GAS SUPPLY LINE MUST BE CAPPED WHEN DISCONNECTED FROM THE HEATER. FOR TEST PRESSURES AT 1/2 PSI (3.5 kPa) OR LESS, THE APPLIANCE NEED NOT BE DISCONNECTED, BUT MUST BE ISOLATED FROM THE SUPPLY PRESSURE TEST BY CLOSING THE MAIN MANUAL GAS VALVE.



BEFORE PLACING THE HEATER IN OPERATION, CHECK FOR GAS LEAKAGE. USE SOAP AND WATER SOLUTION OR OTHER MATERIAL ACCEPTABLE FOR THIS PURPOSE. DO NOT USE MATCHES, CANDLES, FLAME OR OTHER SOURCES OF IGNITION TO LOCATE GAS LEAKS.

RELIEF VALVE (P)-FIG. 1

A NEW TEMPERATURE AND PRESSURE RELIEF VALVE COMPLYING WITH THE STANDARD FOR RELIEF VALVES AND AUTOMATIC GAS SHUT OFF DEVICES FOR HOT WATER SUPPLY SYSTEMS, ANSI Z21.22 (LATEST EDITION) MUST BE INSTALLED IN THE HEATER IN THE MARKED OPENING PROVIDED. THE VALVE MUST BE OF A SIZE (INPUT RATING) THAT WILL BE ADEQUATE FOR YOUR SIZE HEATER.

Check the metal tag on the relief valve and compare it to the heater's rating plate. The pressure rating of the relief valve must not exceed the working pressure shown on the rating plate of the heater. In addition, the hourly Btu rated temperature steam discharge capacity of the relief valve shall not be less than the input rating of the heater. **NO VALVE IS TO BE PLACED BETWEEN THE RELIEF VALVE AND TANK. DO NOT PLUG THE RELIEF VALVE.**

The drain line connected to this valve must not contain a reducing coupling or other restriction and must terminate near a suitable drain to prevent water damage during valve operation. The discharge line shall be installed in a manner to allow complete drainage of both the valve and line. **DO NOT THREAD, PLUG OR CAP THE END OF THE DRAIN LINE.**

VENTING



WARNING

NEVER OPERATE THE HEATER UNLESS THE INTAKE AND EXHAUST ARE VENTED TO THE OUTDOORS AND HAS ADEQUATE AIR SUPPLY TO AVOID RISKS OF IMPROPER OPERATION, FIRE, EXPLOSION, OR ASPHYXIATION.



WARNING

THE SEALED SHOT WATER HEATER IS CERTIFIED FOR VERTICAL VENTING AND SIDE WALL VENTING. THE UNIT CONSISTS OF AN INTAKE VENT TERMINAL AND AN EXHAUST VENT TERMINAL WHICH MUST BE USED TO TERMINATE THE VENTING ARRANGEMENT. IF THE VENT TERMINALS SUPPLIED WITH THIS UNIT ARE NOT USED TO TERMINATE THE VENTING ARRANGEMENT, THE RISK OF IMPROPER OPERATION, FIRE, EXPLOSION, OR ASPHYXIATION WILL INCREASE.

VENT PIPE TERMINATION

NOTE: Before installing the Sealed Shot power vent, it is recommended that the location of the vent pipe terminations (intake vent terminal and exhaust vent terminal) be determined.



WARNING

THIS UNIT CONSISTS OF AN INTAKE VENT TERMINAL AND AN EXHAUST VENT TERMINAL. THE INTAKE VENT TERMINAL CONSISTS OF A 45 DEGREE ELBOW WITH A DIVERTER PLATE AND SCREEN ADAPTER. SEE FIG. 3.

IT IS VERY CRUCIAL THAT THE INTAKE VENT TERMINAL HAS THE DIVERTER PLATE AND SCREEN ADAPTER ORIENTED CORRECTLY AS SHOWN IN FIG. 3. IF THE DIVERTER PLATE IS NOT LOCATED AS SHOWN, GO TO THE NEAREST DEALER AND HAVE THE INTAKE VENT TERMINAL REPLACED.

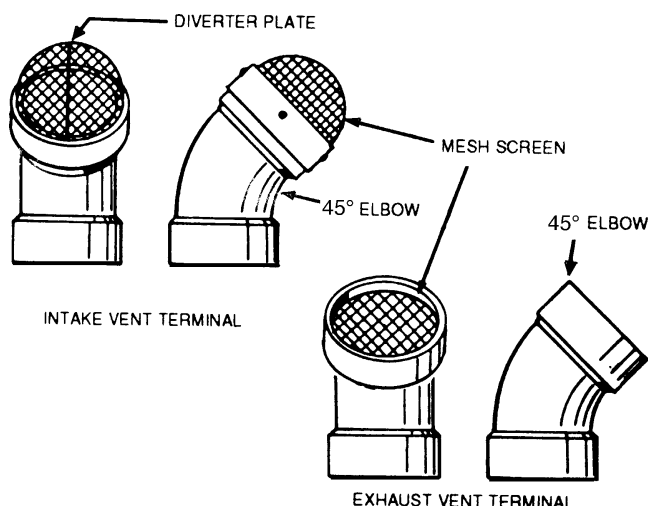


FIGURE 3

THE EXHAUST VENT TERMINAL CONSIST OF A 45 DEGREE ELBOW WITH A MESH SCREEN PRESSED INTO THE ELBOW. SEE FIG 3.



WARNING

IF THE INTAKE VENT TERMINAL AND EXHAUST VENT TERMINAL DO NOT RESEMBLE THE DIAGRAMS SHOWN IN FIG. 3, THEN GO TO THE NEAREST DEALER AND HAVE THEM REPLACE THE VENT TERMINALS WITH THE CORRECT ONES.

VENT TERMINAL INSTALLATIONS

IMPORTANT

The vent system must terminate so that proper clearances are maintained as cited in local codes or the latest edition of the National Fuel Gas Code, ANSI Z223.1, 7.3.4e, and 7.8a, b as follows.

1. The intake and exhaust vent terminals of a mechanical vent system shall be not less than 7 feet above grade when located adjacent to public walkways. (fig. 4)
2. The venting system shall terminate at least 3 feet above any forced air inlet located within 10 feet. (fig. 4)

3. The venting system shall terminate at least 9 inches below, 9 inches horizontally from or 9 inches above any door, window, or gravity air inlet into building.
4. The manufacturer also recommends the vent system terminations not to be installed closer than 3 feet from an inside corner of an L shaped structure, and not less than 1 foot above grade. The vent shall terminate a minimum 12" above expected snowfall level to prevent blockage of vent termination.
5. The vent termination shall not be mounted directly above or within 3 feet horizontally from an oil tank vent or gas meter to avoid potential freeze-up from condensation.

Plan the vent system layout so that proper clearances are maintained from plumbing and wiring.

Vent pipes serving power vented appliances are classified by building codes as "vent connectors". Required clearances from combustible materials must be provided in accordance with information in this manual under LOCATION OF HEATER and VENT HOOD INSTALLATIONS, and with the National Fuel Gas Code and local codes.

IMPORTANT

Plan the layout of the vent system backwards from the vent termination to the appliance. Take into consideration that an elbow will be necessary to make the first vent pipe connection to the blower outlet.



WARNING

USE ONLY THE VENT HOOD SUPPLIED WITH THIS KIT. TERMINATION OF A VENT SYSTEM WITH A DEVICE OTHER THAN THE SUPPLIED VENT HOOD WILL AFFECT SYSTEM PERFORMANCE AND RESULT IN A SAFETY HAZARD.

SIDE WALL VENT TERMINAL INSTALLATION

IMPORTANT

THIS UNIT CONSISTS OF TWO VENT TERMINALS - AN INTAKE VENT TERMINAL AND AN EXHAUST VENT TERMINAL. THE INTAKE VENT TERMINAL IS A 45 DEGREE PVC ELBOW WITH A DIVERTER PLATE AND SCREEN ADAPTER WHILE THE EXHAUST VENT TERMINAL IS A 45 DEGREE ELBOW WITH A MESH WIRE SCREEN.

IMPORTANT

WHEN TERMINATING THE TERMINALS ON A SIDEWALL, THE FOLLOWING SPECIFICATIONS PERTAINING TO TERMINAL LOCATION MUST BE FOLLOWED.

1. The intake vent terminal and the exhaust vent terminal must terminate on the same exterior wall.
2. The vertical centerline of the intake vent terminal must be located at a minimum of 16 inches from the vertical centerline of the exhaust vent terminal.
3. The horizontal centerline of the intake vent terminal may not be located lower than 4 inches below the horizontal centerline of the exhaust vent terminal.

The specifications are displayed in fig. 5.

! WARNING
VENT HOOD(S) MAY BE
EXTREMELY HOT DURING
OPERATION

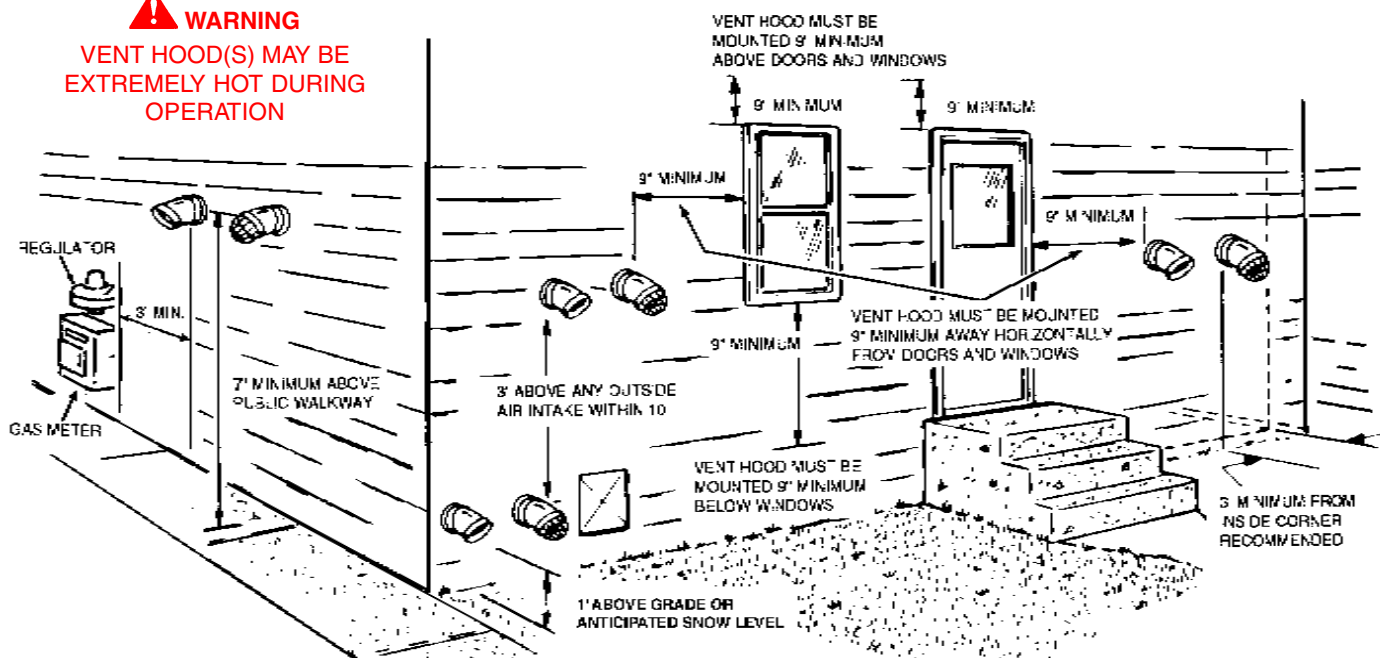


FIGURE 4

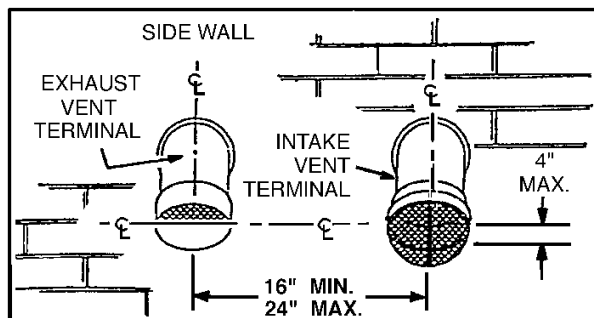


FIGURE 5

INSTALLATION SEQUENCE

NOTE: BEFORE BEGINNING INSTALLATION OF ANY VENT PIPE READ "VENT PIPE PREPARATION" SECTION ON PAGES 12-14.

- After the points of termination have been determined, use the cover plates as templates to mark the holes for the vent pipes to be inserted through the wall. **BEWARE OF CONCEALED WIRING AND PIPING INSIDE OF WALL.**
- If the vent terminals are being installed on the outside of a finished wall, it may be easier to mark both the inside and outside wall. Align the holes by drilling a hole through the center of the template from the inside through to the outside. The template can now be positioned on the outside wall using the drilled holes as a centering point for the template.

- MASONRY SIDE WALLS**
Chisel an opening approximately one half inch larger than the marked circle.

B) WOODEN SIDE WALLS

Drill a pilot hole approximately one quarter inch outside of the marked circle. This pilot hole is used as a starting point for a saws-all or sabre saw blade. Cut around the marked circle staying approximately one quarter inch outside of the line. (This will allow the vent pipe to easily slide through the opening. The resulting gap will be covered up by the vent terminal cover plates.) Repeat this step on the inside wall if necessary.

- Cut a length of 3 inch PVC pipe about 3.5 inches longer than the wall thickness at the opening.
- Glue the intake vent terminal to the section of the pipe.
- Slide the wall plate over the pipe to stop against intake vent terminal.
- Place a bead of caulking (not supplied) around the gap between the pipe and the wall. Place some of the caulking on the back of the plate to hold it against the wall after installation.
- If the vent pipe is installed up to the wall, with a coupling on the end against the wall opening, the pipe with the vent terminal can be prepared for gluing before inserting through the wall. Slide the pipe through the wall and insert into coupling on the other side of the wall, making sure that the vent terminal ends up pointed in the correct position. (fig. 6)

NOTE: Exhaust vent terminal is installed using the same procedure.

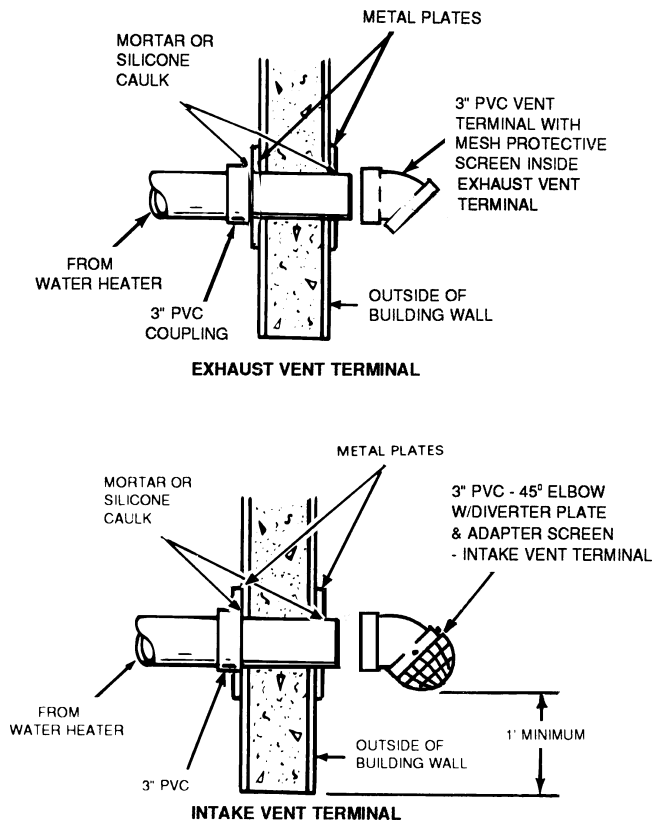


FIGURE 6

VERTICAL VENT TERMINAL INSTALLATION

IMPORTANT

THIS UNIT CONSISTS OF TWO VENT TERMINALS - AN INTAKE VENT TERMINAL AND AN EXHAUST VENT TERMINAL. THE INTAKE VENT TERMINAL IS A 45 DEGREE PVC ELBOW WITH A DIVERTER PLATE AND SCREEN ADAPTER WHILE THE EXHAUST VENT TERMINAL IS A 45 DEGREE ELBOW WITH A MESH WIRE SCREEN.

IMPORTANT

WHEN TERMINATING THE TERMINALS THROUGH A ROOF, THE FOLLOWING SPECIFICATIONS PERTAINING TO TERMINAL LOCATION MUST BE FOLLOWED.

1. In no case should the air intake termination or the exhaust termination extend more than 24" above the roof penetration.
2. Must provide proper support for all pipe protruding through roof.
3. The vertical roof terminations should be sealed with a plumbing roof boot or equivalent flashing.
4. The intake vent termination and the exhaust vent termination must penetrate the same side of roof.
5. The centerline of the intake vent termination and the centerline of the exhaust vent termination must not be closer than 16" and not farther away than 24".

6. The intake vent terminal and the exhaust vent terminal must be oriented facing downward and the same direction.

The specifications are displayed in figure 7.

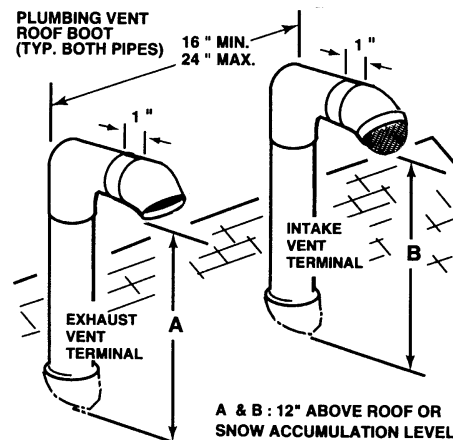


FIGURE 7

INSTALLATION SEQUENCE

NOTE: BEFORE BEGINNING INSTALLATION OF ANY VENT PIPE, READ "VENT PIPE PREPARATION" SECTION ON PAGES 12-14.

1. After the points of termination have been determined, use the cover plates as templates to mark the holes for the vent pipes to be inserted through the roof.
2. Drill a pilot hole approximately one quarter inch outside of the marked circle. This pilot hole is used as a starting point for a saws-all or sabre saw blade. Cut around the marked circle staying approximately one quarter inch outside the line. (This will allow the vent pipe to easily slide through the opening). The resulting gap will be covered up by the roof boot/flashing.
3. Suspend the pipe through the center of the hole using proper support.
4. Slide roof boot or equivalent flashing over pipe and secure roof boot equivalent flashing to roof.
5. Seal around flashing.
6. Terminate intake terminal and exhaust vent terminal facing down as shown in figure 8.

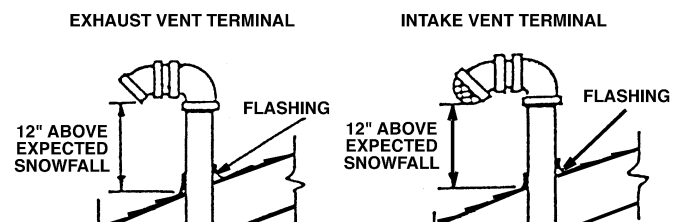


FIGURE 8

INSTALLATION OF BLOWER

1. The blower assembly should be removed from the box containing the PVC PIPE and FITTINGS. Check to make sure that the plastic bag with harness and two hold down clips is in the box and does not get misplaced.
2. Unwrap packing material from the blower assembly. Make sure no material is still attached to the outside or inside of blower assembly. The mounting bracket on the inlet of the blower assembly will need to be removed and turned to the correct orientation before blower assembly is mounted.
3. Remove two (2) screws installed in top cover at mounting locations. Place screws aside for later use in securing blower assembly to top cover.
4. Locate the blower assembly, the 3 inch PVC pipe which is 7 inches in length, and the tee.
5. Take the 3 inch PVC pipe which is 7 inches in length and put glue on one end. Take the end which is covered with glue and insert it into the blower assembly's coupling twisting slowly to make sure the glue is spread evenly. (Fig. 9)

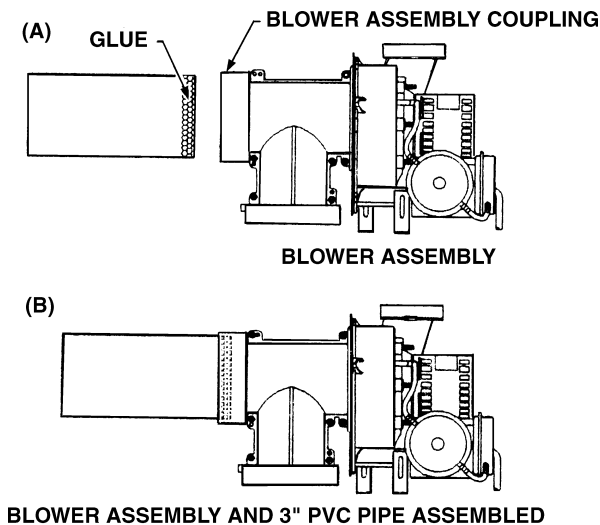


FIGURE 9

6. Find tube of high temperature silicone and the larger flexible rubber coupling with hose clamps in the box that contained the blower assembly. Place the larger flexible rubber coupling on the rear air tube and tighten the hose clamp (Make sure to remove plastic cap on air tube before installing coupling).
7. Cut a 3 inch PVC pipe approximately 4 inches for the 40 gallon and approximately 5.75 inches for the 50 gallon. Take the cut 3 inch PVC pipe and place into rubber coupling and tighten hose clamps. (Fig.10)
8. Locate the blower assembly and previously glued 3 inch PVC pipe and the 3 inch PVC tee. Before gluing the tee and pipe together, first insert pipe into tee and make sure the alignment is correct, glue the pipe and 3 inch PVC tee together. (Fig. 11)

NOTE: The 3 inch PVC tee and 3 inch PVC tee may have a snug fit. If so, use a soft mandrel to help tap the 3 inch PVC pipe into tee if necessary.

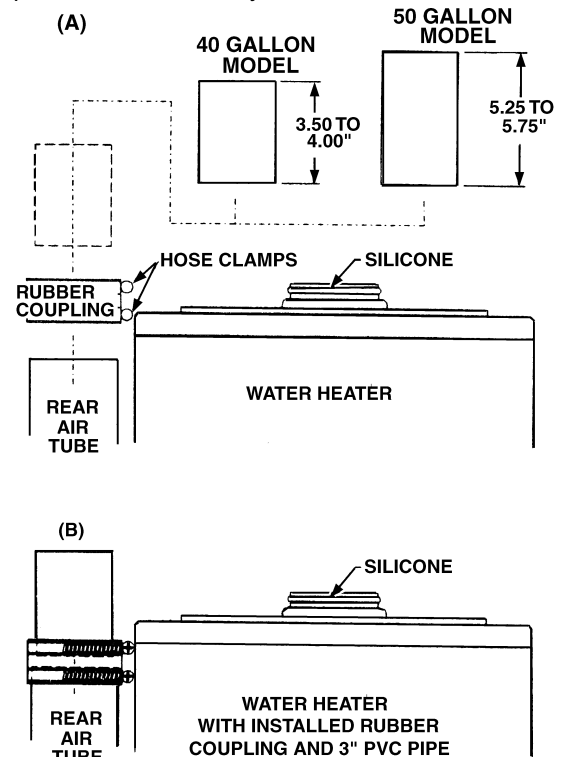


FIGURE 10

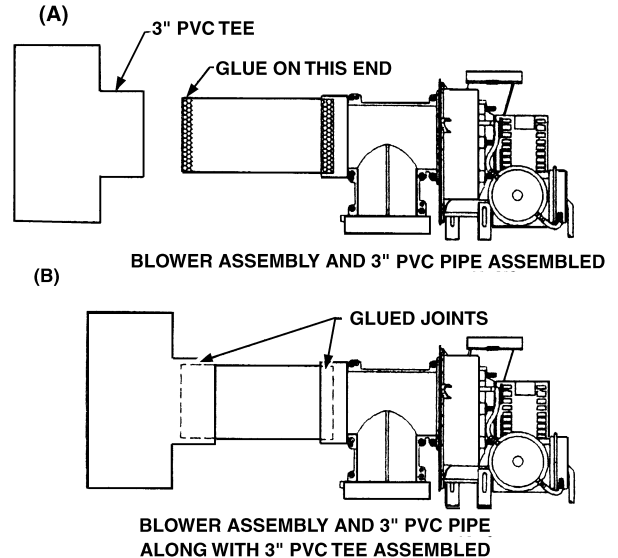


FIGURE 11

NOTE: Because of tolerances built into the water heater, when the blower assembly, the 3 inch PVC pipe, and 3 inch PVC tee is being located on the top of the heater and air tube, the installer may have to shorten the 3 inch PVC pipe cut earlier to fit between the tee and the air tube. The range for the 40 gallon should be between 4 inches to 3.5 inches and the 50 gallon should be between 5.75 inches to 5.25 inches.

NOTE: The installer may have to remove the rear air tube bracket screws to allow the air tube to be shifted right or left to allow proper alignment of the tee to the blower assembly.

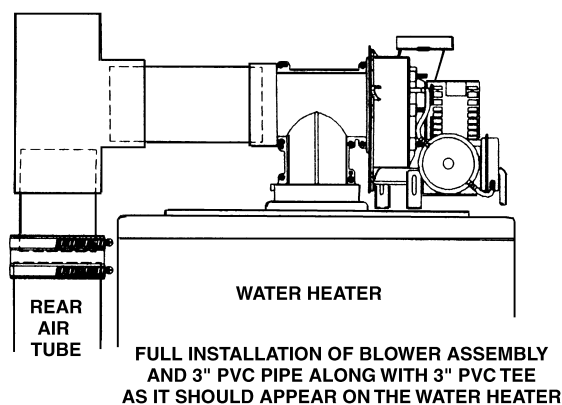
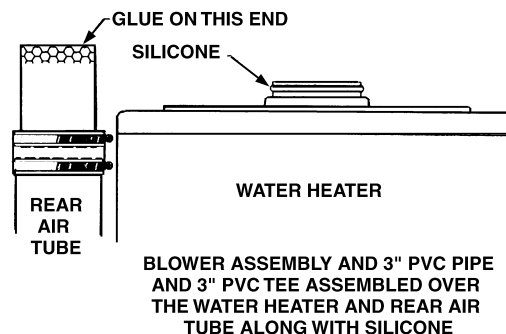
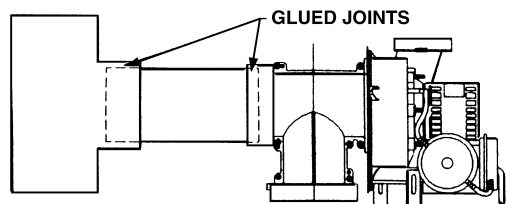


FIGURE 12

9. Once the alignment is correct for the tee to the air tube, apply a 1/8 to 1/4 inch bead of high temperature silicone on the outside circumference of flue pipe approximately 1/4 inch below the end of pipe (see Fig. 10). Next, put glue on the cut 3 inch PVC pipe. Quickly locate the blower assembly, the 3 inch PVC pipe, and the 3 inch PVC tee on to the flue pipe and rear air tube before glue cures (See Fig. 12).
10. Secure the blower assembly with the (2) screws removed earlier. Brackets for securing the blower assembly are slotted to allow for adjustment. Brackets should be adjusted so that they touch the top cover.
11. Now that the blower assembly is fully installed including the 3 inch PVC pipe and the 3 inch PVC tee, make sure that the plastic tubing is still attached to the pressure switch and fan housing.

NOTE: After the blower and fittings are in place, take the excess supply of RTV and apply another bead around the following locations:

1. Inlet tee and rear air flue pipe mating surface.
 2. Tee and coupling joints.
 3. Rear air tube and air box mating.
 4. Tee and cut pipe joint.
12. Retrieve the plastic bag containing the control harness and two clips. The harness should be connected to the front of the control box and the right side of the gas valve. The two clips should be installed on the side of the water heater and the wire placed through the opening in the side of the clip. The clips should be placed so as to hold the harness as close as possible to the side of the unit and away from any hot surfaces.

THIS UNIT IS MANUFACTURED WITH AN EXTERNAL CONTROL HARNESS FOR EASIER REPLACEMENT IF THE HARNESS OR CONNECTORS SHOULD BECOME INOPERABLE.

13. Do not plug in power cord until vent system is completely installed. The power vent operates on 110/115 VAC, therefore, a grounded outlet must be within reach of the 6 foot flexible power cord supplied with the vent (see Fig. 1).

! WARNING

DO NOT USE AN EXTENSION CORD. IF THERE IS NOT A SUITABLE RECEPTACLE AND/OR LOCAL CODES PROHIBIT USE OF A POWER CORD, FIELD WIRING MUST BE PROVIDED. THE APPLIANCE, WHEN INSTALLED, MUST BE ELECTRICALLY GROUNDED IN ACCORDANCE WITH LOCAL CODES OR IN THE ABSENCE OF LOCAL CODES, WITH THE NATIONAL ELECTRICAL CODE, ANSI/NFPA 70.

If local codes do not permit use of a flexible power supply cord:

- A. Remove two screws that secure front plate on control box and remove.
- B. Cut flexible power cord on inside of control box, as close to inside wall as possible.
- C. If flexible cord and strain relief are removed, then opening in box must be covered.
- D. Remove plastic cap in top of control box and install suitable conduit fitting in enclosure.
- E. Splice field wiring into existing wiring using code authorized method (wire nuts, etc.).
- F. Be certain that neutral and line connections are not reversed when making these connections.
- G. Replace front plate and secure with two screws.

! CAUTION

LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. VERIFY PROPER OPERATION AFTER SERVICING.

6. The temperature of the flue gases leaving the blower is about 140 to 175°F after mixing the dilution air in the inlet adapter of the blower. There will be some installations where condensate will be formed in the horizontal runs of the vent system. This condensate **MUST NOT** be allowed to drain back into the fan unit.

One method to catch the condensate before it can run back to the fan is to install a condensate tee just past the first elbow (fig. 15) of the vent pipe system. This set-up will require the installation of a small 3/8 inch O.D. plastic tube, with the proper trap, to drain the condensate to a floor drain. Therefore, a condensate tee is supplied with this unit.

The condensate tee assembly is equipped with the following components:

- 1/2" x 1/4" plastic hose barb fitting
- condensate tee
- 1/4" clear plastic tubing, 8 ft. long

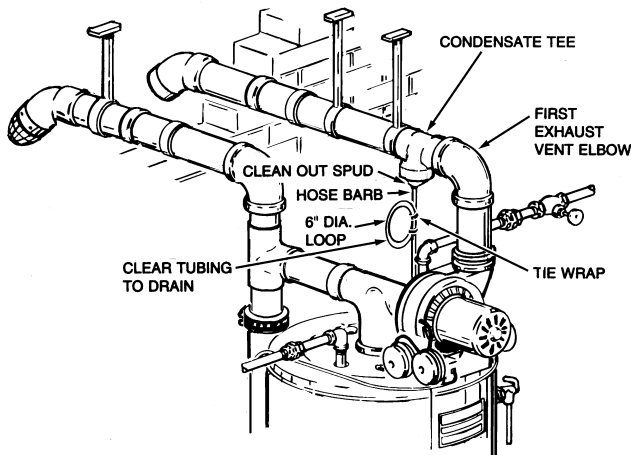


FIGURE 15

To assemble condensate tee, please read the following instructions and refer to figures 15 and 16.

- a. Screw the 1/2" x 1/4" plastic hose barb into clean out spud located on condensate tee.
- b. Slip the 1/4" clear plastic tubing over the 1/2" x 1/4" plastic hose barb fitting.
- c. Take the 1/4" clear plastic tubing and form a 6" diameter loop and use a tie wrap (not supplied with unit) to hold the loop in place.
- d. Install condensate tee into exhaust vent mounted upside down and locate just past the first exhaust vent elbow.
- e. Take other end of the 1/4" clear plastic tubing and run down into a drain or drip pan.

A second method to prevent the condensate from draining back to the fan unit would be to install the vent system with a slight, 1/8 inch per five foot of pipe maximum, downward slope (maximum of 1 inch in total run).

7. The vent system should be installed starting at the blower assembly discharge and running to the coupling installed to join the vent terminal on the inside wall (figures 15 & 16 for reference).

The vent system should be supported every five (5) feet of vertical run and every three (3) feet of horizontal run of vent pipe length. All pipe and fittings should be joined by the proper procedures discussed in the "VENT PIPE PREPARATION" section.

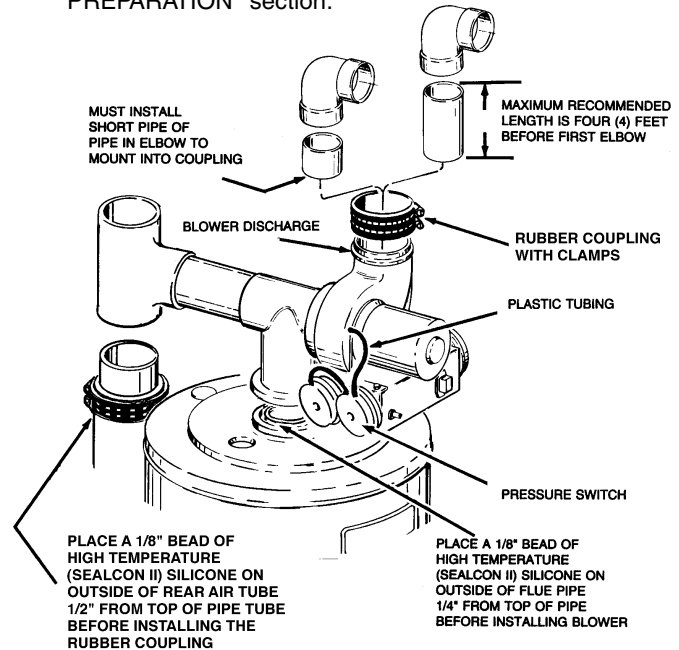


FIGURE 16

VENT PIPE PREPARATION

1. INITIAL PREPARATION

- A. Make sure the solvent cement you are planning to use is designed for the specific application you are attempting.
- B. Know the physical and chemical characteristics and limitations of the PVC and CPVC piping materials that you are about to use.
- C. Know the reputation of your manufacturer and their products.
- D. Know your own qualifications or those of your contractor. The solvent welding technique of joining PVC and CPVC pipe is a specialized skill just as any other pipe fitting technique.
- E. Closely supervise the installation and inspect the finished job before start-up.
- F. Contact the manufacturer, supplier, or competent consulting agency if you have any questions about the application or installation of PVC and CPVC pipe.
- G. Take the time and effort to do a professional job. Shortcuts will only cause you problems and delays in start-up. By far, the majority of failures in PVC and CPVC systems are the result of shortcuts and/or improper joining techniques.

2. SELECTION OF MATERIALS

- Cutting Device - Saw or Pipe Cutter
- Deburring Tool, Knife, File, or Beveling Machine (2" and above)
- Brush - Pure Bristle
- Rag - Cotton (Not Synthetic)

- Primer and Cleaner
- Solvent Cement - PVC for PVC Components and CPVC for CPVC Components
- Containers - Metal or Glass to hold Primer and Cement. Select the type of PVC or CPVC materials to be used on the basis of their application with respect to chemical resistance, pressure rating, temperature characteristics, etc.
- Insertion Tool - Helpful for larger diameter pipe and fittings (6" and above).

PRIMER

It is recommended that Tetrahydrofuran (THF) be used to prepare the surfaces of pipe and fittings for solvent welding. Do not use water, rags, gasoline or any other substitutes for cleaning PVC or CPVC surfaces. A chemical cleaner such as MEK may be used.

CEMENT

The cement should be a bodied cement of approximately 500 to 1600 centipoise viscosity containing 10-20% (by weight) virgin PVC material solvated with tetrahydrofuran (THF). Small quantities of dimethyl formamide (DMF) may be included to act as a retarding agent to extend curing time. Select the proper cement; Schedule 40 cement should be used for Schedule 40 pipe. Never use all-purpose cements, commercial glues and adhesives or ABS cement to join PVC or CPVC pipe and fittings.

SAFETY PRECAUTION: PRIMERS AND CEMENTS ARE EXTREMELY FLAMMABLE, AND MUST NOT BE STORED OR USED NEAR HEAT OR OPEN FLAME. ALSO, USE ONLY IN A WELL VENTILATED AREA!

APPLICATORS

Select a suitable pure bristle type paint brush. Use a proper width brush or roller to apply the primer and cement (see chart below). Speedy application of cement is important due to its fast drying characteristics. **IMPORTANT NOTE:** A dauber type applicator should only be used on pipe sizes 2" and below. For larger diameter pipe, a brush or roller must be used.

**RECOMMENDED BRUSH* SIZE
FOR PRIMER AND CEMENT APPLICATIONS**

Nominal Pipe Size (IPS)	Brush Width (in.)
3	1 1/2 - 2 1/2

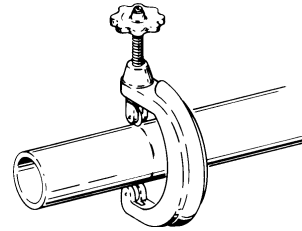
*Use Only Natural Bristle

3. MAKING THE JOINT

A. Cutting

Pipe must be squarely cut to allow for the proper interfacing of the pipe end and the fitting socket bottom. This can be accomplished with a miter box saw or wheel type cutter. Wheel type cutters are not generally recommended for larger diameters since they tend to flare the corner of the pipe end. If this type of cutter is used, the flare on the end must be completely removed.

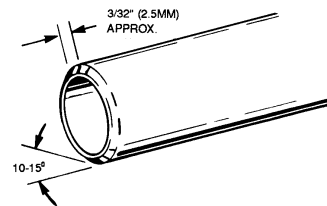
NOTE: Power saws should be specifically designed to cut plastic pipe.



STEP A

B. Deburring

Use a knife, plastic pipe deburring tool, or file to remove burrs from the end of small diameter pipe. Be sure to remove all burrs from around the inside as well as the outside of the pipe. A slight chamfer (bevel) of about 10°-15° should be added to the end to permit easier insertion of the pipe into the end of the fitting. Failure to chamfer the edge of the pipe may remove cement from the fitting socket, causing the joint to leak.



STEP B

C. Test dry fit of the joint

Tapered fitting sockets are designed so that an interfaced fit should occur when the pipe is inserted about 1/3 to 2/3 of the way into the socket. Occasionally, when pipe fitting dimensions are at the tolerance extremes, it will be possible to fully insert dry pipe to the bottom of the fitting socket. When this happens, a sufficient quantity of cement must be applied to the joint to fill the gap between the pipe and fitting. The gap must be filled to obtain a strong, leak-free joint.

D. Inspection, cleaning, priming

Visually inspect the inside of the pipe and fitting sockets and remove all dirt, grease or moisture with a clean dry rag. If wiping fails to clean the surfaces, a chemical cleaner must be used. Check for possible damage such as splits or cracks and replace if necessary.

Depth-of-entry mark

Marking the depth of entry is a way to check if the pipe has reached the bottom of the fitting socket in step F. Measure the fitting depth and mark this distance on the pipe O.D. You may want to add several inches to the distance and make a second mark as the primer and cement will most likely destroy your first one.

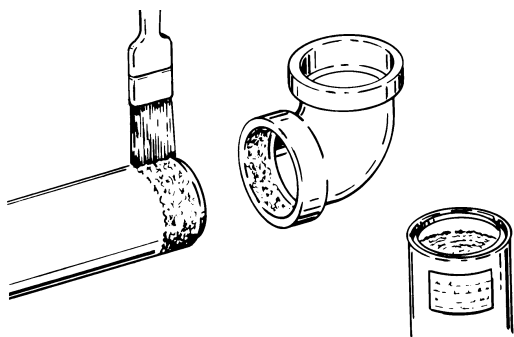
Apply primer to the surface of the pipe and fitting socket with a natural bristle brush (see chart). This process softens and prepares the PVC or CPVC for the solvent cementing step. Move quickly and without hesitation to the cementing procedure While the surfaces are still wet with primer.

E. Application of solvent cement

- Apply the solvent cement evenly and quickly around the outside of the pipe at a width slightly greater than the depth of the fitting socket.
- Apply a light coat of cement evenly around the inside of the fitting socket. Avoid puddling.

- Apply a second coat of cement to the pipe end.

NOTE: Cans of cement and primer should be closed at all times when not in use to prevent evaporation of chemicals and hardening of cement. They are also very flammable and should be kept away from heat or flame.



STEP E

F. Joint assembly

Working quickly, insert the pipe into the fitting socket bottom and give the pipe or fitting a 1/4" turn to evenly distribute the cement. Do not continue to rotate the pipe after it has hit the bottom of the fitting socket. A good joint will have sufficient cement to make a bead all the way around the outside of the fitting hub. The fitting will have a tendency to slide back while the cement is still wet so hold the joint together for about 15 seconds.

G. Cleanup and joint movement

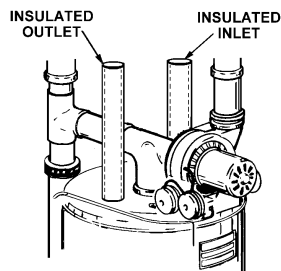
Remove all excess cement from around the pipe and fitting with a dry cotton rag. This must be done while the cement is still soft.

The joint should not be disturbed immediately after the cementing procedure, and sufficient time should be allowed for proper curing of the joint. Exact drying time is difficult to predict because it depends on variables such as temperature, humidity and cement integrity. For more specific information, you should contact your solvent cement manufacturer.

PIPE INSULATION INSTALLATION

1. Remove pipe insulation from carton.

2. Fit pipe insulation over the in coming cold water line and the hot water line. Make sure that the insulation is against top cover of heater.



OPERATION

NEVER OPERATE THE HEATER WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER AND A TEMPERATURE AND PRESSURE RELIEF VALVE IS INSTALLED IN THE RELIEF VALVE OPENING OF THE HEATER. DO NOT ATTEMPT TO OPERATE HEATER WITH COLD WATER INLET VALVE CLOSED.

TO OPERATE THE WATER HEATER

1. Close the heater drain valve by turning handle clockwise. Fig. 1(T)
2. Open a nearby hot water faucet to permit the air in the system to escape.
3. Fully open the cold water inlet pipe valve allowing the heater and piping to be filled. Fig. 1(M)
4. Close the hot water faucet as water starts to flow.
5. The heater is ready to be operated.

TEMPERATURE REGULATION



! DANGER

THIS WATER HEATER IS EQUIPPED WITH AN ADJUSTABLE THERMOSTAT TO CONTROL WATER TEMPERATURE. HOT WATER TEMPERATURES REQUIRED FOR AUTOMATIC DISHWASHER AND LAUNDRY USE CAN CAUSE PAINFUL SCALDING WITH POSSIBLE SERIOUS AND PERMANENT INJURY. THE TEMPERATURE AT WHICH INJURY OCCURS VARIES WITH THE PERSON'S AGE AND THE TIME OF THE EXPOSURE. THE SLOWER RESPONSE TIME OF CHILDREN, AGED OR DISABLED PERSONS INCREASES THE HAZARDS TO THEM. NEVER ALLOW SMALL CHILDREN TO USE A HOT WATER TAP, OR TO DRAW THEIR OWN BATH WATER. NEVER LEAVE A CHILD OR DISABLED PERSON UNATTENDED IN A BATHTUB OR SHOWER.

THE WATER HEATER SHOULD BE LOCATED IN AN AREA WHERE THE GENERAL PUBLIC DOES NOT HAVE ACCESS. IF A SUITABLE AREA IS NOT AVAILABLE, A COVER SHOULD BE INSTALLED OVER THE THERMOSTAT TO PREVENT TAMPERING. Suitable covers are available through A.O. Smith Water Products Company, 5621 W. 115th Street, Alsip, IL 60803.

It is recommended that lower water temperatures be used to avoid the risk of scalding. It is further recommended, in all cases, that the water temperature dial, Figure 17, be set for the lowest temperature which satisfies your hot water needs. This will also provide the most energy efficient operation of the water heater. The water temperature adjusting dial was factory set at the lowest temperature. Turning the dial counterclockwise decreases temperature and clockwise increases temperature.

SETTING THE WATER HEATER TEMPERATURE AT 120°F (APPROX. "HOT" MARK ON TEMPERATURE SETTING DIAL OF GAS VALVE) WILL REDUCE THE RISK OF SCALDS. Some states require settings at specific lower temperatures.

Figure 17 shows the approximate water temperatures produced at various thermostat dial settings. Short repeated heating cycles caused by small hot water uses can cause temperatures at the point of use to exceed the thermostat setting by up to 30°F. If you

FOR YOUR SAFETY READ BEFORE OPERATING

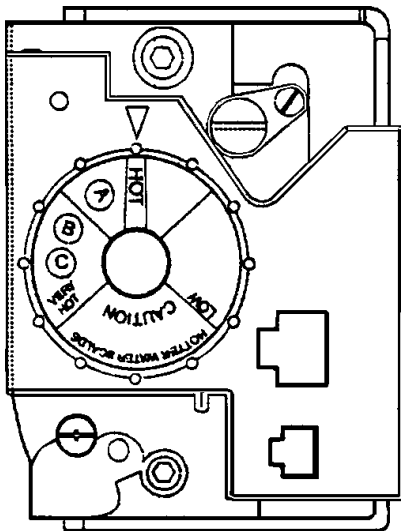


WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

BEFORE OPERATING: ENTIRE SYSTEM MUST BE FILLED WITH WATER AND AIR PURGED FROM ALL LINES.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner.
DO NOT TRY TO LIGHT THE BURNER BY HAND.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- C. If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to turn the gas control lever. Never use tools. If the lever will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS



1. **STOP!** Read the safety information above on this label.
2. Turn the "ON/OFF" switch on the blower control box to the "OFF" position.
3. Set the thermostat to the lowest setting. Turn thermostat dial fully counterclockwise until it stops.

4. This appliance is equipped with a device which automatically lights the burner.
DO NOT TRY TO LIGHT THE BURNER BY HAND.
5. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
6. Set thermostat to desired setting.
7. Turn on all electrical power to the appliance.
8. If the appliance will not operate, follow the instructions "TO TURN OFF GAS TO APPLIANCE" and call your technician or gas supplier.
9. **WATER TEMPERATURE ADJUSTMENT**
Turn temperature knob by hand to the desired temperature.
Hot is approximately 120°F.



CAUTION: Hotter water increases the risk of scald injury. Consult the instruction manual before changing temperature.

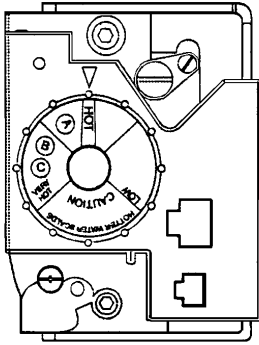


WARNING: TURN OFF ALL ELECTRIC POWER BEFORE SERVICING

TO TURN OFF GAS TO APPLIANCE

- A. Set thermostat to the lowest setting.
- B. Turn off all the electric power to the appliance if service is to be performed.

experience this type of use you should consider using lower temperature settings to reduce scald hazards.



Temperature Setting	Time to Produce 2nd & 3rd Degree Burns on Adult Skin
VERY HOT = approx. 160°F	about 1/2 seconds
C = approx. 150°F	about 1 - 1/2 seconds
B = approx. 140°F	Less than 5 seconds
A = approx. 130°F	About 30 seconds
HOT = approx. 120°F	More than 5 minutes
LOW = approx. 80°F	-----

FIGURE 17

Valves for reducing the point of use temperature by mixing cold and hot water are available. See figure 2. Also available are inexpensive devices that attach to faucets to limit hot water temperatures. Contact a licensed plumber or the local plumbing authority.

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, TURN OFF THE MAIN MANUAL GAS SHUTOFF VALVE TO THE APPLIANCE. SEE FIGURE 1 (G).

HIGH ALTITUDE INSTALLATION



WARNING

INSTALLATIONS ABOVE 6500 FEET REQUIRE REPLACEMENT OF THE BURNER ORIFICE IN ACCORDANCE WITH THE NATIONAL FUEL GAS CODE (ANSI Z223.1/NFPA 54). FAILURE TO REPLACE THE ORIFICE WILL RESULT IN IMPROPER AND INEFFICIENT OPERATION OF THE APPLIANCE, PRODUCING CARBON MONOXIDE GAS IN EXCESS OF SAFE LIMITS, WHICH COULD RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

WATER HEATING IGNITION SEQUENCE

(Make sure gas and electric power are connected properly)

- 1) The ignition control module is powered and monitors the system, waiting for a call for heat from the thermostat.
- 2) The thermostat calls for heat by reading a resistance value within a given range directly proportional to water temperature.
- 3) The Control Module:

- a) Checks the pressure switches for an open circuit.
 - b) Energizes the blower.
 - c) Checks the pressure switches for a closed circuit to prove draft.
 - d) Sends line voltage to the hot surface igniter with a 7-second warm up period.
 - e) Opens the gas valve and checks the sensing rod for flame.
- 4) The burner heats the water to the desired thermostat setting.
 - a) The resistance in the thermostat rises to the value selected by the temperature control knob.
 - b) The control module closes the gas valve and 5 seconds later, removes power from the blower.
 - 5) Cycle is completed.

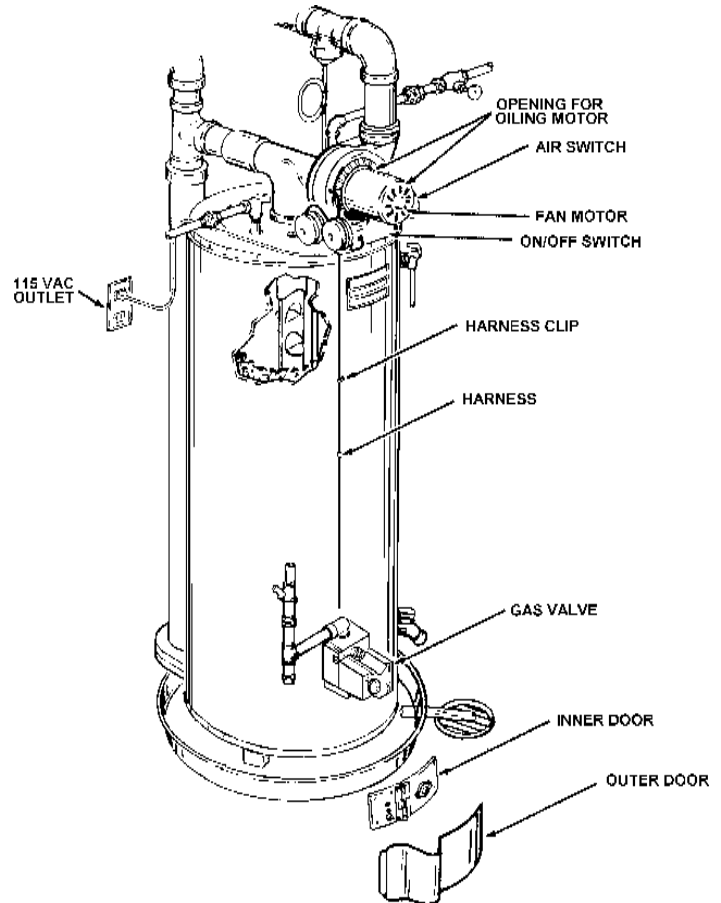


FIGURE 18

CONTROL SEQUENCE-HOT SURFACE DIRECT IGNITION	
Pre-purge	5 sec.
HSI Warm-up	7 sec. 1st try, then 12 sec.
Ignition Activation Period	3 sec.
Flame Recognition Period	1 sec.
Ignition Trail	4 sec.
Interpurge	30 sec.
Post-purge	5 sec.
Retries	3
Reset from Lockout	1 hr.
Flame Sensing (Nominal) HSI Off/Run Mode	0.4μ



MAINTENANCE



WARNING

DISCONNECT FROM ELECTRICAL SUPPLY BEFORE SERVICING UNIT.

FOR YOUR SAFETY, WATER HEATER SERVICE SHOULD BE PERFORMED ONLY BY A QUALIFIED SERVICE TECHNICIAN. READ THE GENERAL SAFETY INFORMATION SECTION FIRST.

USERS OF THIS APPLIANCE SHOULD BE AWARE THAT GAS COMPONENTS WEAR OUT OVER A PERIOD OF TIME. THE GAS CARRYING COMPONENTS OF THIS APPLIANCE SHOULD BE INSPECTED FOR PROPER OPERATION PERIODICALLY BY A QUALIFIED SERVICE TECHNICIAN.

MAIN BURNER

Check main burner every 12 months for proper flame characteristics. This is done by removing door(s) on heater, fig. 1. The main burner should provide complete combustion of gas; ignite rapidly; give reasonably quiet operation; cause no excessive flame lifting from burner ports. Make sure that the flow of combustion and ventilation air is not blocked.

If proper flame characteristics are not evident, check for accumulation of lint or other foreign material that restricts or blocks the air openings in the heater or burner. Also check AIR REQUIREMENTS.



WARNING

SOOT BUILD-UP INDICATES A PROBLEM THAT REQUIRES CORRECTION BEFORE FURTHER USE. CONSULT WITH A QUALIFIED SERVICE TECHNICIAN.

Should the main burner or burner air openings require cleaning, turn the blower switch to "OFF" position and allow the burner to cool. Remove the burner and clean with a soft brush. Clean main burner orifice with a suitable soft material.

HIGH TEMPERATURE LIMIT SWITCH (Single-Use Type Energy Cut Off)

The thermostat has a built-in limit switch which will actuate in case of excessive water temperatures. The heater cannot be relit until the ECO (labeled as single-use type) is replaced. It is important that a serviceman be called to determine the reason for limit operation

and thus avoid repeated thermostat replacement. Lower the temperature adjustment dial setting on new control.

VENTING SYSTEM

HAVE VENTING SYSTEM CHECKED EVERY SIX MONTHS FOR OBSTRUCTIONS AND/OR DETERIORATION IN VENT PIPING.

POWER VENTER MAINTENANCE

The "SEALED SHOT" venter must be inspected four times a year. Points of inspection are:

1. **MOTOR** - Motor must rotate freely. Oil every three months of operation with 4 drops of SAE 20 oil.
2. **WHEEL** - Wheel must be clean of soot, lint, ash or any other coating which inhibits either rotation or air flow. Remove all foreign material from vent system before operating.
3. The pressure switch part inside the power venter must be open and free from deposits of soot, carbon, etc.

For safety and satisfactory operation it is recommended that the heater be checked once a year by a competent service person.

T & P VALVE

At least once a year, the temperature and pressure relief valve must be checked to ensure that it is in operating condition. Lift the lever at the top of the valve several times until the valve seats properly and operates freely.



DANGER

THE WATER PASSING OUT OF THE VALVE DURING THIS CHECKING OPERATION MAY BE EXTREMELY HOT. AVOID CONTACT AND DISCHARGE SAFELY TO PREVENT WATER DAMAGE.

DRAINING

If the heater is to be shut off and exposed to freezing temperatures, it must be drained. Water, if left in the tank and allowed to freeze, will damage the heater.

- Turn off the gas and cold water inlet valve to the heater.
- Open a nearby hot water faucet and the heater drain valve
- **BE CAREFUL TO GRASP THE DRAIN VALVE HANDLE SO THAT THE HAND IS NOT EXPOSED TO HOT WATER. IF DESIRED, A HOSE MAY BE CONNECTED TO THE DRAIN VALVE TO CARRY THE WATER AWAY.**



DANGER: The water CAN BE HOT.

- The drain valve must be left open during the shutdown period.
- To restart heater, refer to the FILLING instructions under OPERATION.

Periodically open the drain valve and allow the water to run until it flows clean. This will help prevent sediment build-up in the tank.

It is normal for lime and scale deposits to form within the tank. Such deposits will not be removed by periodic draining. It is necessary to chemically delime the affected parts in water areas where such deposits are encountered. See page 2 for recommended deliming information.

CONDENSATION

Water vapor can condense on the cooler surfaces of the tank forming droplets, these drip into the fire or run out on the floor. This is common at the time of startup after installation, during periods of time when incoming water is very cold, or the heater may be undersized for the requirements.

Droplets from the bottom of the flue may be due to corrosive combustion products or improper vent. Check with your dealer for more information.

CATHODIC PROTECTION - ANODE

The anode rod within the tank is designed to be slowly consumed cathodically, minimizing corrosion in the glass lined tank. A hydrogen sulfide (rotten egg) odor may result if water contains high sulfate and/or minerals. Chlorinating the water supply should minimize the problem. (See EXTENDED NON-USE PERIODS).

NOTE: Anode must remain installed (except for inspection) to avoid shortening tank life. See LIMITED WARRANTY. Replace as necessary.



WARNING: DO NOT BY-PASS ANY CONTROLS TO MAKE HEATER OPERATE. OPERATE ONLY AS WIRED FROM FACTORY.

TROUBLE SHOOTING GUIDE

Please check guidelines below. For your safety, water heater service should be performed only by a qualified service technician. Read the GENERAL SAFETY INFORMATION section first.

PROBLEM	LED STATUS	CAUSE	SOLUTION
GAS VALVE	Off	No Power to system control.	Check for power to heater. Check wiring harness for proper connections. Check for line voltage at harness connectors.
	1 Flash	Setpoint error, internal failure detected.	Replace gas control valve.
	2 Flashes	Pressure switch failed to open.	Replace pressure switch. Replace blower assembly.
	3 Flashes	Pressure switch failed to close.	Replace pressure switch. Replace blower assembly.
	4 Flashes	ECO activated. Blower Assembly is energized. Internal hardware failure.	Replace ECO. Replace gas control valve. Replace gas control valve.
	5 Flashes	Flame signal sensed out of sequence. Blower Assembly is energized.	Insure that burner stays lit. Insure that igniter wires are not loose at gas valve. Replace gas control valve. Insure that burner stays lit. Insure that igniter wires are not loose at gas valve. Replace gas control valve.
	6 Flashes	System lockout.	Gas supply is off or too low to operate. Damaged or broken HSI element. Appliance not properly earth ground. Flame sense rod contaminated or not positioned correctly. HSI element not positioned correctly. HSI element or flame sense rod wiring not connected properly. Less than 100Vac between flame rod and burner pan with 120Vac input to control. Cycle external power or remove request for heat for 2 seconds before reapplying.
	Rapidly blinking	Water temperature is below 36 degrees F.	Wait until gas control generates a self-reset.

TROUBLE SHOOTING GUIDE (Continued)

PROBLEM	CAUSE	SOLUTION
NOT ENOUGH OR NO HOT WATER	1) Blower will not run.	
	A) "ON/OFF" control switch turned off.	Turn switch to the "ON" position.
	B) Blower unplugged.	Plug blower back into 115 vac. outlet.
	C) No power at outlet.	Repair service to outlet.
	D) Thermostat defective.	Replace thermostat.
	E) Control harness defective.	Replace control harness.
	F) High limit control circuit open.	Replace ECO.
	G) Blower motor defective.	Replace Blower Assembly.
	Thermostat problems	
	A) Thermostat set too low.	Turn temperature control higher.
	B) Thermostat or ECO defective.	Replace thermostat or ECO as required.
	Others	
	A) Heater undersized.	Reduce hot water use.
	B) Low gas pressure.	Contact dealer.
	C) Incoming water is unusually cold.	Allow more time for heater to re-heat.
	D) Leaking hot water pipes or fixtures.	Have plumber check and repair leaks.
VENT PIPE TOO HOT (ABOVE 170°F)	A) Defective air flow restrictor.	Take unit out of service immediately, call an A.O. Smith service representative.
	B) Not enough dilution air to mix with flue gases in inlet tee.	Proper dilution air must be provided for combustion and dilution of flue temp. Refer to "INSTALLATION" section.
	C) Dilution air too hot for mixing with flue gases.	Supply air is too hot. Check for heat sources around intake terminal and blockage of dilution air leg.
	D) Wrong burner orifice.	Install correct orifice.
YELLOW FLAME	A) Dirt in burner ports.	Turn off heater and gas, clean burner head.
	B) Combustion air path restricted.	Check intake venting arrangement for obstructions.
	C) Not enough dilution air for proper combustion.	Check intake venting arrangement for obstructions.
CONDENSATION	A) Water on the floor under heater.	See "CONDENSATION".
	B) Water dripping from fan.	Provide drip "TEE" to catch condensation, see figure 1.
WATER LEAKS	Improperly sealed, hot or cold supply connections, relief valve, drain valve or thermostat threads.	Tighten threaded connections.
	Leakage from other appliances or water lines.	Inspect other appliances near water heater.
	Condensation of flue products.	Refer to CONDENSATION.
LEAKING T&P	Thermal expansion in closed water system.	Install thermal expansion tank (DO NOT plug T&P valve).
	Improperly seated valve.	Check relief valve for proper operation (DO NOT plug T&P valve).
HOT WATER ODORS (Refer to CATHODIC PROTECTION)	High sulfate or mineral content in water supply.	Drain and flush heater thoroughly then refill.
	Bacteria in water supply.	Chlorinate water supply.
WATER TOO HOT	Thermostat set too high.	Refer to HIGH TEMPERATURE REGULATION.
WATER HEATER SOUNDS: SIZZLING-RUMBLING	Condensation dripping on burner.	Refer to CONDENSATION above.
	Sediment at bottom of heater tank.	Clean sediment from tank. Refer to DRAINING instruction in Maintenance section of manual.
SOOTING	Improper combustion	Refer to AIR REQUIREMENTS on page 4.

LIMITED RESIDENTIAL GAS WARRANTY

THIS WARRANTY IS APPLICABLE TO THE ORIGINAL OWNER ONLY. If the glass lined tank in this water heater shall prove upon examination by A. O. Smith Corporation (the warrantor) to have leaked during the warranty period in normal residential use, due to natural corrosion from potable water therein, the warrantor will furnish the ORIGINAL OWNER a replacement A. O. Smith water heater of equivalent size and current model, or a replacement thermostat or thermocouple which fails in normal use, in accordance with the warranty terms and conditions specified below. THE A. O. SMITH REPLACEMENT MODEL OR PART WILL BE WARRANTED FOR ONLY THE UNEXPIRED PORTION OF THE ORIGINAL WARRANTY. The warranty period will be determined by the original installation date of the water heater. PROOF-OF-PURCHASE AND PROOF-OF-INSTALLATION ARE NECESSARY TO VALIDATE THIS WARRANTY. This warranty is not transferable and applies to models listed in Table 1.

TABLE 1 WARRANTY PERIOD		
MODEL	TANK ¹	PARTS ²
FPD	6 YEARS	2 YEARS

When the water heater has been used for other than single family residential application: 1. The tank warranty shall be reduced to 3 years for 10 year models, and 1 year for 6 year models. 2. The parts warranty shall be reduced to one year for all models. Returned parts which meet any of the following conditions are not covered by this warranty: 1) Improper installation or removal, 2) damaged by other than normal wear, 3) replaced for cosmetic purposes, or 4) returned with defaced date codes.

CONDITIONS AND EXCEPTIONS

This warranty shall apply only when the water heater is installed and operated in accordance with 1) all local fire codes and plumbing codes, ordinances and regulations, 2) the printed instructions provided with it, 3) good industry practices, and 4) proper safety practices such as but not limited to a properly sized drain pan if installed in an area where leakage from connections of the tank would result in damage to the area adjacent to the heater. In addition, a new temperature and pressure relief valve, certified by the American Gas Association must have been properly installed and piped to the nearest drain.

This warranty shall apply only when the heater is:

- owned by the original purchaser;
- used at temperatures not exceeding the maximum calibrated setting of its thermostat;
- not subjected to excessive water pressure fluctuations and not subject to an operating pressure greater than 150 P.S.I.;
- filled with potable water, free to circulate at all times and with the tank free of damaging water sediment or scale deposits;
- used in a non-corrosive and non-contaminated atmosphere;
- used with factory approved anode(s) installed;
- in its original installation location;
- in the United States, its territories or possessions, and Canada;
- sized in accordance with proper sizing techniques for residential water heaters;
- bearing a rating plate which has not been altered, defaced or removed except as required by the warrantor;
- not used in a closed system without a properly sized and installed thermal expansion tank;
- fired at the factory rated input using the fuel stated on the face of the rating plate;
- operated with the inner and outer combustion chamber doors in place;
- maintained in accordance with the instructions printed in the manual included with the heater.

Any accident to the water heater or any part thereof (including freezing, fire, floods, or lightning), any misuse, abuse or alteration of it, any operation of it in a modified form, or any attempt to repair tank leaks or parts, will void this warranty.

SERVICE AND LABOR RESPONSIBILITY

UNDER THIS LIMITED WARRANTY, THE WARRANTOR WILL PROVIDE ONLY A REPLACEMENT WATER HEATER OR PART THEREOF. THE OWNER IS RESPONSIBLE FOR ALL OTHER COSTS. Such costs may include but are not limited to:

- a. Labor charges for service, removal, or reinstallation of the water heater or part thereof.
- b. Shipping and delivery charges for forwarding the new water heater or replacement part from the nearest distributor and returning the claimed defective heater or part to such distributor except in the state of California where such charges are the manufacturer's responsibility.
- c. All cost necessary or incidental for handling and administrative charges, and for any materials and/or permits required for installation of the replacement heater or part.

LIMITATION ON IMPLIED WARRANTIES

Implied warranties, including any warranty of merchantability imposed on the sale of this heater under state law are limited to one year duration for the heater or any of its parts. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

CLAIM PROCEDURE

Any claim under this warranty should be initiated with the dealer who sold the heater, or with any other dealer handling the warrantor's products. If this is not practical, the owner should contact: A. O. Smith Water Products Company, 5621 W. 115th Street, Alsip, Illinois, 60803 (800) 323-2636. Canadian customers should contact A. O. Smith Enterprises, Ltd., P.O. Box 310-768 Erie Street, Stratford, Ontario N5A 6T3 (519) 271-5800.

The warrantor will only honor replacement with identical or similar water heater or parts thereof which are manufactured or distributed by the warrantor.

Dealer replacements are made subject to in-warranty validation by warrantor.

PROOF-OF-PURCHASE AND PROOF-OF-INSTALLATION DATES ARE REQUIRED TO SUPPORT WARRANTY FOR CLAIM FROM ORIGINAL OWNER. THIS FORM DOES NOT CONSTITUTE PROOF-OF-PURCHASE OR PROOF-OF-INSTALLATION.

DISCLAIMERS

NO EXPRESSED WARRANTY HAS BEEN OR WILL BE MADE IN BEHALF OF THE WARRANTOR WITH RESPECT TO THE HEATER OR THE INSTALLATION, OPERATION, REPAIR OR REPLACEMENT OF THE HEATER OR PARTS. THE WARRANTOR SHALL NOT BE RESPONSIBLE FOR WATER DAMAGE, LOSS OF USE OF THE UNIT, INCONVENIENCE, LOSS OR DAMAGE TO PERSONAL PROPERTY, OR OTHER CONSEQUENTIAL DAMAGE. THE WARRANTOR SHALL NOT BE LIABLE BY VIRTUE OF THIS WARRANTY OR OTHERWISE FOR DAMAGE TO ANY PERSONS OR PROPERTY, WHETHER DIRECT OR INDIRECT, AND WHETHER ARISING IN CONTRACT OR IN TORT.

Some states do not allow the limitation or exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

IMPORTANT INFORMATION

Model Number _____

Serial Number _____

Installation Information _____

Date Installed _____

Company's Name _____

Street or P.O. Box _____

City, State, and Zip Code _____

Phone Number _____

Plumber's Name _____